

GUIDELINES FOR SPECIALIST TRAINING IN PAEDIATRIC CARDIOLOGY

Approved by the British Paediatric Cardiac Association and the Specialist Advisory Committee in Cardiology of the Joint Committee on Higher Medical Training of the Royal College of Physicians and prepared by Stewart Hunter in collaboration with Michael Tynan and Eric Silove

INTRODUCTION

Paediatric cardiology is the specialty concerned with diseases of the heart in the growing and developing individual (Association of European Paediatric Cardiologists 1992). Changes in the practice of paediatric cardiology over the past two decades necessitated a fresh definition of work patterns, training, and required expertise. Paediatric cardiologists need to be trained in the investigation and treatment of patients with congenital or acquired heart disease, disorders of cardiac rhythm and conduction, and disturbances of cardiac and circulatory function. The specialty provides a service from fetal life through childhood into adulthood and needs close liaison with paediatrics and its subspecialties, and with cardiothoracic surgery, adult cardiology, obstetrics, radiology, and pathology.

Paediatric cardiology in the United Kingdom has always been an academic as well as clinical specialty and the paediatric cardiologist has a major role in the education of students, doctors, primary health care specialists, nurses, and paramedical personnel. Most paediatric cardiologists engage in basic or clinical research. The skills required to practise paediatric cardiology are extensive and include electrocardiography, echocardiography and Doppler ultrasound, exercise testing, and other imaging techniques as well as invasive methods such as catheterisation, angiocardiology, and electrophysiology. The paediatric cardiologist must be expert in the treatment of arrhythmias, insertion and management of pacemakers, and interventional techniques such as balloon septostomy, balloon dilatation, and occlusion of vessels or congenital defects.

General medical training

Entry into paediatric cardiology has been from both paediatrics and cardiology. The Calman report suggests that two years of general medical training is required before the candidate acquires MRCP or equivalent. For paediatric cardiology two years seems too short a time to acquire the wide experience necessary for the subspecialty and to allow doctors to decide to become paediatric cardiologists. During general medical training the trainee is expected to acquire experience in paediatrics (especially neonatology) and adult cardiology.

Research

All candidates training in paediatric cardiology are expected to undertake clinical or basic research at some

time before or during higher professional training. Clinical research should be performed within regional paediatric cardiology centres and should last at least one year. It is expected that where appropriate time spent in clinical research will be accreditable towards higher professional training.

Higher professional training

A minimum of five years will be spent in higher professional training, culminating in an exit certification. To set out on five years of higher professional training in paediatric cardiology directly from the SHO grade constitutes a major step in career development at a very early stage. It is anticipated that this will lead to more variation in career direction than at present and flexibility will be needed to allow change of course for candidates who wish to move during higher professional training between specialties. Higher professional training must occur in accredited training posts in regional paediatric cardiological centres.

Monitoring of the candidate's progress will be by internal assessment at yearly intervals with formal interviews by the training consultants. At the end of the second and fifth years external assessment will be undertaken by a representative of the trainers, the regional postgraduate dean or his representative, and an external paediatric cardiologist. Documentation of training will occur including logging of attainment of targets in basic clinical skills such as intensive care, interpretation of electrocardiograms, haemodynamic data, echocardiography, and other imaging techniques, management of arrhythmias, cardiac pacing, fetal echocardiography, cardiac catheterisation, and interventional techniques. A logbook will be filled in for each trainee throughout higher professional training.

The following paragraphs detail the expected progress through training. The skills have been listed in order—starting with the electrocardiogram and finishing with advanced interventional techniques. Flexibility is essential, however, and local situations may alter the order and method of achieving these educational aims.

A major concern is that the new training regulations are geared towards "one centre" training programmes as in North America. One of the benefits in the previous training programme was that paediatric cardiologists were trained in more than one centre and the BPCA intends to implement an exchange scheme to preserve this advantage.

Much of the acute experience is gained by trainees while assessing and handling emergency admissions. The profession has expressed concern about dilution of experience resulting from reduction in on-call commitment for doctors in training. Any further reduction in on-call commitment over and above the existing regulations would necessitate reassessment of the length of the training period in individual cases and centres.

FIRST YEAR TARGET

From the very beginning of higher professional training the candidates must be fully integrated into the clinical work of the training department. The candidate must be committed throughout the five years to at least one outpatient clinic per week under consultant supervision including new and follow up patients and adolescents and adult patients with congenital heart disease. Inpatient management is similarly vital with continuing and regular participation at all stages.

Early in the first year interpretation and reporting of electrocardiograms will be learned by formal reporting of ECGs under audit by one of the trainers. The trainee will be expected to scan and report on ten 24 hour tapes (if necessary on secondment to an adult cardiological unit).

An introduction to the methodology of exercise testing ought to be included in the first year during day release to an adult cardiological unit—on 10 occasions.

During the first six months the candidate should spend one session per week reporting chest x rays with a consultant radiologist (preferably cardiac). This activity will provide formal background training to the assessment of x rays taken at routine and emergency admissions and weekly assessment of angiograms during combined surgical meetings.

Echocardiography is such an important part of the diagnosis and management of congenital heart disease that it is essential early in the first year for the candidate to attend a foundation course on paediatric echocardiography. Thereafter a planned audited programme of performance and reporting of echocardiograms (including all types) should take place. The candidate should perform 50 echocardiographic assessments of acute infant admissions the results being audited by one of the trainers.

Haemodynamic investigation is also a vital part of the training of a paediatric cardiologist but does not need a foundation course. It is essential during year one that the trainee undergoes one on one training including calculation and presentation of data as well as performance of catheterisation. A minimum of fifty diagnostic catheterisations should be experienced in this period, initially as an assistant.

A basic understanding of cardiac anatomy and the anatomy of congenital cardiac malformations is essential and in the first year the candidate should attend an approved foundation course in cardiac anatomy and nomenclature. Thereafter it is recommended that a regular review of specimens, within the regional centre, should be carried out under supervision by the training consultant or pathologist.

Basic clinical skills during the first year should include an introduction to postoperative intensive care where the candidate should acquire the necessary practical skills including cardiopulmonary resuscitation, insertion of long lines, and management of cardiovascular support.

At an early stage in the first year candidates should undergo training in advanced paediatric life support (APLS) and achieve certification.

SECOND YEAR TARGETS

The skills learned in the first year will continue to be refined and progress towards increasing responsibility should be continuous.

By now the trainee should be undertaking diagnostic catheterisation as first operator and should be first assistant at interventional procedures. By the end of the second year 50 catheterisations as first operator including performance, calculation, and presentation should have been completed.

During the second year the trainee should attend a foundation course on the management and diagnosis of arrhythmias in childhood. Thereafter further experience of arrhythmia management would come automatically during clinical practice.

It is important that trainees become familiar with the insertion and management of pacemakers. During the second year it is recommended that they assist in the insertion of 20 pacemakers in a regional pacing centre on day release from the department of paediatric cardiology—the number of pacemakers inserted by paediatric cardiological units is not high enough to allow sufficient experience inhouse. Throughout the remainder of the training period to maintain the skill a further 10 pacemakers should be inserted under supervision.

Magnetic resonance imaging and computed tomography both have a place in the diagnosis of congenital heart disease. Candidates in paediatric cardiology should be familiar with the potential of both techniques. It is probably correct to concentrate on MRI and attendance at a foundation course during the second year would seem appropriate. Thereafter attendance at 10 sessions watching and participating in magnetic resonance imaging of heart disease would ensure familiarity with the mechanics and the methods involved.

THIRD, FOURTH, AND FIFTH YEAR TARGETS

A formal and detailed assessment of the candidate's progress at the completion of the second year is critical as it will determine his/her suitability to continue towards certification and will identify any shortfall in skills, knowledge, and experience. At the end of the second year therefore it may be necessary for the panel of assessors to identify training deficiencies in the trainee or the department and programme the subsequent years appropriately. An important skill to be learned in the third year is prenatal diagnosis. It will be necessary to attend a foundation course in fetal echocardiography. Thereafter attendance as observer at 50 fetal scans and associated counselling sessions should be followed by a personal performance of 50 fetal scans during remaining years of training, to give a background level of expertise. Paediatric cardiologists who wish to specialise will obviously do many more than the basic numbers of procedures. Some regional centres do sufficient scans to allow their trainee cardiologist to get experience inhouse; however, in centres where fetal echocardiography is either not done or done in small numbers it will be necessary for candidates to be seconded to one of the major centres.

During the final three years the candidate should be exposed to more advanced imaging techniques such as transoesophageal (TOE) and intraoperative ultrasound. The theory and practice of these techniques may be acquired in one of several courses which are run in the United Kingdom. A minimum of 20 TOEs on patients with congenital heart disease must be undertaken, under supervision.

In the last three years candidates should be capable of independent clinical action in the management of inpatients and outpatients. Unsupervised echocardiography and diagnostic cardiac catheterisation would be expected at the end of the third year. By the end of the fourth the trainee should be competent in basic catheter interventions. The numbers required are difficult to assess. It is reasonable to expect the candidate at the time of certification to be competent in balloon pulmonary valvotomy and balloon atrial septostomy. Duct occlusion along with aortic valvotomy and angioplasty for coarctation should certainly be included in the experience of the candidate. More advanced techniques (insertion of intracardiac umbrellas, stenting of the duct, radiofrequency ablation of arrhythmias etc) will probably only be learned by those specialising in interventional work. None the less the candidate should be exposed to such techniques during the fourth and fifth years. By the time of certification the successful candidate should have performed more than 50 interventional procedures of all types.

It is anticipated that by the end of the fourth year the candidate will be capable of deputising for consultants in all aspects of routine inpatient care and diagnostic procedures.

SUMMARY

Year 1

- One outpatient clinic per week
- On call commitment ideally not less than 1 in 4

- Formally audited reporting of ECGs
- Ten 24 hour tapes scanned and reported
- Audited reporting of chest x rays
- Foundation paediatric echocardiography course
- 50 documented and audited echocardiographic assessments in acute infant admissions
- 50 diagnostic catheterisations under supervision
- Foundation course in cardiac anatomy and congenital anomalies
- Advanced life support system training and certification

Year 2

- 50 catheterisations as first operator
- Foundation course on management and diagnosis of arrhythmias in childhood
- 20 pacemaker insertions
- Foundation course on magnetic resonance imaging
- Outpatient and on-call commitment continued

Years 3, 4, and 5

- Foundation course in fetal echocardiography
- Attendance at 50 fetal scans followed by performance of 50 scans
- 20 transoesophageal echocardiograms performed under supervision
- Gradual exposure to interventional techniques, leading to 50 procedures as first operator
- Outpatient and on-call commitment continued